

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONALER RECHERCHENBERICHT

(Artikel 18 sowie Regeln 43 und 44 PCT)

Aktenzeichen des Anmelders oder Anwalts <b>10orr/129226/PCT</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>WEITERES VORGEHEN</b> </div> <div style="width: 55%;">           siehe Formblatt PCT/ISA/220 sowie, soweit zutreffend, nachstehender Punkt 5         </div> </div>	
Internationales Aktenzeichen <b>PCT/EP2004/008228</b>	Internationales Anmeldedatum (Tag/Monat/Jahr) <b>23/07/2004</b>	(Frühestes) Prioritätsdatum (Tag/Monat/Jahr) <b>29/07/2003</b>
Anmelder  <b>RECARO AIRCRAFT SEATING GMBH &amp; CO. KG</b>		

Dieser internationale Recherchenbericht wurde von der Internationalen Recherchenbehörde erstellt und wird dem Anmelder gemäß Artikel 18 übermittelt. Eine Kopie wird dem Internationalen Büro übermittelt.

Dieser internationale Recherchenbericht umfaßt insgesamt 7 Blätter.

☒ Darüber hinaus liegt ihm jeweils eine Kopie der in diesem Bericht genannten Unterlagen zum Stand der Technik bei.

**1. Grundlage des Berichts**

a. Hinsichtlich der **Sprache** ist die internationale Recherche auf der Grundlage der internationalen Anmeldung in der Sprache durchgeführt worden, in der sie eingereicht wurde, sofern unter diesem Punkt nichts anderes angegeben ist.

☐ Die internationale Recherche ist auf der Grundlage einer bei der Behörde eingereichten Übersetzung der internationalen Anmeldung (Regel 23.1 b)) durchgeführt worden.

b. ☐ Hinsichtlich der in der internationalen Anmeldung offenbarten **Nucleotid- und/oder Aminosäuresequenz** siehe Feld Nr. 1.

2. ☐ **Bestimmte Ansprüche haben sich als nicht recherchierbar erwiesen** (siehe Feld II).

3. ☐ **Mangelnde Einheitlichkeit der Erfindung** (siehe Feld III).

**4. Hinsichtlich der Bezeichnung der Erfindung**

☒ wird der vom Anmelder eingereichte Wortlaut genehmigt.

☐ wurde der Wortlaut von der Behörde wie folgt festgesetzt:

**5. Hinsichtlich der Zusammenfassung**

☐ wird der vom Anmelder eingereichte Wortlaut genehmigt.

☒ wurde der Wortlaut nach Regel 38.2b) in der in Feld Nr. IV angegebenen Fassung von der Behörde festgesetzt. Der Anmelder kann der Behörde innerhalb eines Monats nach dem Datum der Absendung dieses internationalen Recherchenberichts eine Stellungnahme vorlegen.

**6. Hinsichtlich der Zeichnungen**

a. ist folgende Abbildung der **Zeichnungen** mit der Zusammenfassung zu veröffentlichen: Abb. Nr. 1

☒ wie vom Anmelder vorgeschlagen

☐ wie von der Behörde ausgewählt, weil der Anmelder selbst keine Abbildung vorgeschlagen hat.

☐ wie von der Behörde ausgewählt, weil diese Abbildung die Erfindung besser kennzeichnet.

b. ☐ wird keine der Abbildungen mit der Zusammenfassung veröffentlicht.

## INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen

PCT/EP2004/008228

## A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES

IPK 7 B64D11/06 B60N2/00 G06K19/067 G06K7/015

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

## B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)

IPK 7 B64D B60N G06K

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

EP0-Internal, WPI Data

## C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
E	EP 1 462 349 A (HONDA MOTOR CO LTD) 29. September 2004 (2004-09-29) Absätze [0001], [0008]; Abbildungen	1
X	US 6 412 813 B1 (JOHNSON WENDELL C ET AL) 2. Juli 2002 (2002-07-02) Spalte 21, Zeilen 5-9	1
Y	US 6 107 920 A (GHAEM SANJAR ET AL) 22. August 2000 (2000-08-22) Spalte 2, Zeilen 47-57 Spalte 3, Zeilen 46-55; Abbildungen	1-9
Y	US 6 561 580 B1 (BERGEY KARL H) 13. Mai 2003 (2003-05-13) Zusammenfassung	1-9
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☒ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen☒ Siehe Anhang Patentfamilie

\* Besondere Kategorien von angegebenen Veröffentlichungen :

"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist

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"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht

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"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann allein aufgrund dieser Veröffentlichung nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden

"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist

"&amp;" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche

1. Februar 2005

Absendedatum des internationalen Recherchenberichts

12. 04. 05

Name und Postanschrift der Internationalen Recherchenbehörde

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Bevollmächtigter Bediensteter

Salentiny, G

## C.(Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	DE 198 40 785 A (HABERMANN A GMBH & CO KG) 23. März 2000 (2000-03-23) das ganze Dokument	1-9
A	[Online] XP002304960 "Federal Aviation Regulation Sec 23.1301" INTERNET ARTICLE Gefunden im Internet: URL: <a href="http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgFAR.nsf/0/E6B97FEAE6681A3E85256687007048B0?OpenDocument">http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgFAR.nsf/0/E6B97FEAE6681A3E85256687007048B0?OpenDocument</a>	
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Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen

PCT/EP2004/008228

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# INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen

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## Feld II Bemerkungen zu den Ansprüchen, die sich als nicht recherchierbar erwiesen haben (Fortsetzung von Punkt 2 auf Blatt 1)

Gemäß Artikel 17(2)a) wurde aus folgenden Gründen für bestimmte Ansprüche kein Recherchenbericht erstellt:

1. ☐ Ansprüche Nr.  
weil sie sich auf Gegenstände beziehen, zu deren Recherche die Behörde nicht verpflichtet ist, nämlich
2. ☐ Ansprüche Nr.  
weil sie sich auf Teile der internationalen Anmeldung beziehen, die den vorgeschriebenen Anforderungen so wenig entsprechen, daß eine sinnvolle internationale Recherche nicht durchgeführt werden kann, nämlich
3. ☐ Ansprüche Nr.  
weil es sich dabei um abhängige Ansprüche handelt, die nicht entsprechend Satz 2 und 3 der Regel 6.4 a) abgefaßt sind.

## Feld III Bemerkungen bei mangelnder Einheitlichkeit der Erfindung (Fortsetzung von Punkt 3 auf Blatt 1)

Die internationale Recherchenbehörde hat festgestellt, daß diese internationale Anmeldung mehrere Erfindungen enthält:

siehe Zusatzblatt

1. ☒ Da der Anmelder alle erforderlichen zusätzlichen Recherchegebühren rechtzeitig entrichtet hat, erstreckt sich dieser internationale Recherchenbericht auf alle recherchierbaren Ansprüche.
2. ☐ Da für alle recherchierbaren Ansprüche die Recherche ohne einen Arbeitsaufwand durchgeführt werden konnte, der eine zusätzliche Recherchegebühr gerechtfertigt hätte, hat die Behörde nicht zur Zahlung einer solchen Gebühr aufgefordert.
3. ☐ Da der Anmelder nur einige der erforderlichen zusätzlichen Recherchegebühren rechtzeitig entrichtet hat, erstreckt sich dieser internationale Recherchenbericht nur auf die Ansprüche, für die Gebühren entrichtet worden sind, nämlich auf die Ansprüche Nr.
4. ☐ Der Anmelder hat die erforderlichen zusätzlichen Recherchegebühren nicht rechtzeitig entrichtet. Der internationale Recherchenbericht beschränkt sich daher auf die in den Ansprüchen zuerst erwähnte Erfindung; diese ist in folgenden Ansprüchen erfaßt:

Bemerkungen hinsichtlich eines Widerspruchs

- ☐ Die zusätzlichen Gebühren wurden vom Anmelder unter Widerspruch gezahlt.
- ☒ Die Zahlung zusätzlicher Recherchegebühren erfolgte ohne Widerspruch.

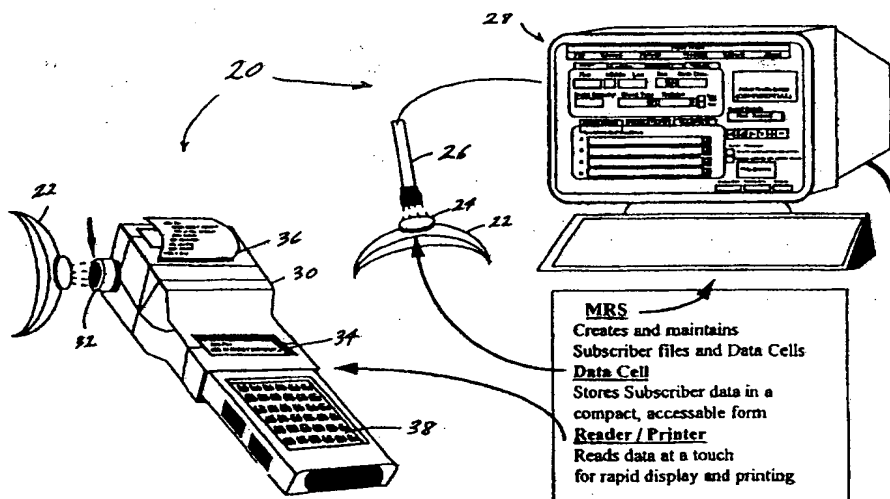
## Feld Nr. IV Wortlaut der Zusammenfassung (Fortsetzung von Punkt 5 auf Blatt 1)

Die Erfindung betrifft einen Sitz, insbesondere Fahrzeugsitz, vorzugsweise Fluggastsitz (10, 30), mit mindestens einer Sitzkomponente, wie beispielsweise einem Sitzteil (20), einer Rückenlehne (22) oder einer Armlehne (26), wobei der Sitz im Auslieferungszustand vorgegebene Zulassungsvorschriften erfüllt und dementsprechend zertifiziert ist, dadurch gekennzeichnet, dass an mindestens einer Sitzkomponente ein Datenspeicher fest angeordnet ist zum Speichern von individuellen, hinsichtlich der Lebensdauer oder der Zertifizierung des jeweiligen Sitzes und/oder einzelner Sitzkomponenten relevanten Daten, und dass der Datenspeicher von einem externen Lesegerät elektronisch aus lesbar ist, sowie ein zugehöriges Lesegerät.

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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification 6:</b> <b>A61B 5/117</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 97/22297</b> <b>(43) International Publication Date:</b> 26 June 1997 (26.06.97)
<b>(21) International Application Number:</b> PCT/US96/20398 <b>(22) International Filing Date:</b> 16 December 1996 (16.12.96) <b>(30) Priority Data:</b> 08/575,718      20 December 1995 (20.12.95)      US <b>(71) Applicant:</b> LIFE ALERT, LTD. [US/US]; 5828 North Caldwell Avenue, Chicago, IL 60646 (US). <b>(72) Inventors:</b> YEAGER, Edward, J.; 5828 North Caldwell Avenue, Chicago, IL 60646 (US). BRISSEY, Lee; 19221 170th Avenue N.E., Woodenville, WA 98072 (US). <b>(74) Agents:</b> HURD, Michael, B. et al.; Shook, Hardy & Bacon L.L.P., One Kansas City Place, 1200 Main Street, Kansas City, MO 64105 (US).	<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.          Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	

**(54) Title:** MEDICAL INFORMATION RECORD SYSTEM**(57) Abstract**

A medical information record system provides access to medical information of persons in emergency response situations. The system includes a portable data storage device (22) located in a carrier worn by a person. The portable data storage device contains current medical information records specific to the person wearing the device. A handheld reader (30) accesses the medical records contained in the portable data storage device via a probe (32) and a display for displaying the information to medical personnel. A distributed medical record database system (76) operates in conjunction with the reader and portable storage device for managing the personal medical information records. The distributed database system includes a central database location in communication with at least one localized database system location for coordination of medical records on a national scale. The distributed medical record database system includes the capability of creating and managing the personal medical records, and recording the personal medical records on the portable data storage device.



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## MEDICAL INFORMATION RECORD SYSTEM

### FIELD OF THE INVENTION

The present invention relates to medical information record systems, and more particularly, to a medical information record system for providing access to medical  
5 information of persons in emergency response situations.

### BACKGROUND OF THE INVENTION

Emergency response teams often lack critical medical information which may aid in the diagnosis and stabilization of an incapacitated person. The elderly may be especially difficult to treat, often exhibiting the combination of complex medical  
10 conditions and limited communication ability. If the person under treatment is awake and coherent, some of this information may be obtained verbally. However, often the medically-incapacitated person is unconscious or unaware of the relevant medical information.

A number of potential data storage and retrieval systems have been  
15 proposed to address this problem. These include wristwatches with internal storage memory, wristbands with small LCD displays, smart cards, or optical disks. For example, U.S. Patent No. 5,337,290 is directed to a health watch that provides instant access to critical medical data. The health watch is worn on the wrist like a conventional wristwatch, and contains integrated circuit memory which includes data relating to  
20 medical conditions such as vital signs, chronic conditions, allergies, medications, etc. Specifically, in the '290 patent, the small digital wristwatch houses an 8051 microcomputer, memory, and an LCD screen. Buttons on the watch call up specified medical data which is shown on the LCD screen. The electronic circuitry for computing, data storage and data I/O is contained within an Application Specific Integrated  
25 Circuit (ASIC) which is custom-designed for this application in order to meet the very restricted packaging constraints. One drawback to the device of the '290 patent is that it is relatively expensive and thus drives the cost of every device by the cost of the custom ASIC and the required LCD display screen. Additionally, complex keystrokes are required to display the requested data on very limited display screen sizes. The device  
30 also has a limited memory capability and display capacity, requiring the operator to sequence through a number of keystrokes to display all required information.

Another device similar to the '290 patent is shown in U.S. Patent No. 5,012,229 which is directed to a wearable/personal medical information device that includes a memory for storing medical information related to the person wearing the device. The device described in the '229 patent is a flexible wristband and like the  
5 previous patent, it also uses a built-in LCD screen to display pertinent patient personal and/or medical data. The device contains Read Only Memory (ROM) for storing certain data such as medical information, and a Random Access Memory (RAM) for other data which the user may change from time-to-time. The '229 patented device also has a built-in computer and display electronics for accessing and displaying stored data with an  
10 eight character legend display showing the category of data and sixteen character data display showing the specific medical data. Again, like the '290 patent, this patent describes a very expensive solution requiring every wearer to effectively purchase an expensive computer/display.

None of the systems proposed to date adequately address the problem of  
15 acquiring, maintaining, and updating the critical wearer's data. For example, card-based medical data systems require that response teams locate and then access relevant data from a card often located in a wallet or purse. Such a system is described in U.S. Patent No. 4,491,725 which is directed to a medical insurance verification processing system that uses a medical information card to determine a patient's background, medical, and  
20 insurance information. The system uses a card that can be in the form of a "smart card" having an integrated circuit chip which is accessible by means of an appropriate communication device.

Another disadvantage of card and optical disk-based systems is that they suffer from lack of data standards, making it difficult to broadly distribute the technology.  
25 Thus, there is a need for a system that provides response teams with critical medical information that is easily located and accessed.

### SUMMARY OF THE INVENTION

In view of the foregoing, it is the primary aim of the present invention to provide a medical information record system that provides rapid access to a person's current medical information in emergency response situations.

5 In accomplishing that aim, it is an object of the present invention to provide a distributed medical database system designed to provide rapid access to critical patient medical data for clinics, paramedics, and emergency response teams.

Another object of this invention is to provide a portable data storage module containing current personal medical information that is easily identifiable and  
10 locatable.

A related object of the present invention is to provide a medical information record system that allows emergency medical personnel to rapidly gain access to medical information of incapacitated persons.

An additional object of this invention is to provide a simple, reliable, and  
15 inexpensive memory element, having the memory capacity to maintain all relevant medical data of a person in a compact, dime-sized package.

These and other important aims and objectives are accomplished in accordance with the medical information record system of the present invention. The medical information record system provides access to medical information of persons in  
20 emergency response situations by providing a portable data storage device located in a carrier worn by a person. The portable data storage device contains current medical information specific to the person wearing the data storage device. A handheld reading device accesses the medical information contained in the portable data storage device via a probe and a display for displaying the medical information to medical personnel. The  
25 medical information record system of the present invention also includes a distributed medical record database system that generates and manages personal medical information records. The database system includes a central database system location in communication with at least one localized database system location for coordination of the medical information records on a national scale. The database system also includes  
30 the ability to update personal medical records so that the records contain current personal

medical information, and the ability to record the medical records on the portable data storage device.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The various aspects of the invention are described in detail below, with  
5 reference to the drawings, in which:

FIG. 1 is a schematic diagram illustrating the components of the medical  
information record system of the present invention;

FIG. 2 is a closeup view of the portable data storage device of the present  
invention shown in FIG. 1;

10 FIG. 3A is a block diagram illustrating the process for creating and  
updating medical records in accordance with the present invention;

FIG. 3B is a block diagram illustrating the process for accessing medical  
information from the medical information record system of the present invention;

FIG. 4 is a block diagram illustrating the components of the portable data  
15 storage device shown in FIG. 2;

FIG. 5 is a block diagram illustrating the central and local administration  
sites of the distributed medical record database system used in the present invention;

FIG. 6 is a functional flow diagram illustrating the process for creating,  
updating, and verifying medical records in accordance with the present invention;

20 FIG. 7A shows a detailed layout of the main display of the medical  
information record system of the present invention;

FIG. 7B shows a series of screen captures of various medical-related  
information used in the medical information record system of the present invention;

FIG. 8 is a block diagram further illustrating the details of the handheld  
25 reading device for accessing medical information shown in FIG. 1; and

FIG. 9 is a diagram illustrating the keyboard/display of the handheld  
reading device shown in FIG. 8.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A medical information record system according to the present invention is broadly designated in FIG. 1 by the reference numeral 20. Medical record system 20 is a distributed medical record database system designed to provide rapid access to critical patient medical data for clinics, paramedics, and ER response teams. As shown in FIG. 1, the medical record system 20 of the present invention employs a PC-based medical record system to create, maintain, and update a portable data storage device 22 which contains current medical data and is worn by a patient or subscriber with a critical medical history. In the illustrated embodiment, the portable data storage device 22 is in the form of a bracelet, although the device 22 could be worn by a user in a necklace, badge, wristwatch, etc. Portable data storage device 22 includes a small, compact datacell which contains current medical information specific to the person wearing device 22.

As shown in FIG. 1, medical information important for rapid stabilization and treatment in emergency medical situations, as well as other pertinent medical and personal information, is downloaded to datacell 24 of portable data storage device 22 via a datacell probe 26. Probe 26 is part of a distributed medical record database system 28 for generating, maintaining, and updating personal medical information records. The medical information from datacell 24 can then be accessed by a handheld reading device 30. As shown in FIG. 1, handheld reading device or reader 30 includes a datacell probe 32 for electronically reading the data from datacell 24 in wireless fashion. Reader 30 also includes a data viewing screen 34 so that medical personnel can view a person's medical information after being accessed by probe 32. A printer 36 allows medical personnel to optionally obtain a paper tape printout of the medical data accessed by reader 30. Additionally, reader 30 includes a keyboard 38 for controlling various functions of reader 30.

Referring now to FIG. 2, datacell 24 is shown located on a bracelet 40 and alternatively on a badge 42. The medical information storable in datacell 24 includes information such as subscriber ID number, subscriber name, date of birth, bloodtype, existing medical conditions (diabetes, epilepsy, etc.), current medications, sensitivities or allergies (poison oak, bee, venom, etc.), allergies to medication, emergency contact

phone number, physician contact number, organ donor status, revision level of datacell, date of datacell creation, etc. Candidates for a portable data storage device 22 include elderly patients in a nursing home or managed care living environment, patients with severe allergic sensitivities, epileptic patients, patients with serious heart disease, diabetic patients, etc. As shown in FIG. 2, another application of medical record system 20 includes a medical datacell 24 integrated with an employee badge to allow medical response teams to rapidly access critical data in the event of a medical emergency at the workplace.

FIG. 3A illustrates the process of both creating and updating database records in medical information record system 20 and in associated datacells 24. Those individuals or institutions subscribing to the services provided by medical information record system 20 of the present invention would compile new patient data at step 44 and enter this new patient data into the database associated with medical information record system 20 as denoted at step 46. This information is both stored in a database hard disk location 48 as well as in a datacell itself as shown in step 50. Datacells 24 are marked in an easily-recognizable form and worn on the patient in the form of a bracelet, necklace, ring, etc as mentioned above. The datacell 24 provides a compact, rugged, semi-permanent and readily-accessible data storage medium for medical records.

FIG. 3B illustrates the use of datacell 24 in an emergency response call situation. After responding to an emergency call, the facility medical staff or response team would locate the medical datacell as denoted at step 52, and would access or read the current medical data from datacell 24 with handheld reader 30 as shown in step 54. Handheld reader 30 displays the medical data on the display screen as shown by step 56, and optionally prints a hardcopy of the record as shown in step 58. Additionally, the emergency response team could optionally transmit the pertinent medical data forward to the emergency room staff as indicated at step 60 using facilities equivalent to those used to forward EKG data.

In accordance with the present invention, the key memory technology employed by the present invention for the portable data storage device is a small, rugged, self-contained memory device with built-in power as required for long-term data retention and self-contained data communication circuitry. FIG. 4 illustrates that

datacell 24, in the preferred embodiment, is "dime-sized" (about 16mm or less in diameter and 6mm or less in height) and thus suitable for mounting and comfortably worn in a bracelet, necklace, or some other easily located and accessed carrier. Datacell 24, as shown in the block diagram of FIG. 4, contains a microcircuit non-volatile  
5 memory 62 in the form of either a battery powered Static Random Access Memory (SRAM) or Electrically Programmable Read Only Memory (EPROM). Datacell 24 contains a minimum of 4,096 bits of non-volatile read/write memory with data storage provisions to provide at least a ten year data retention.

Datacell 24 contains all necessary data transfer circuitry 64 for read/write  
10 operations, and a cyclic redundancy check (CRC) circuit 66 for transmission error detection. The device also contains a permanently stored and externally readable digital ID code 68 to uniquely identify the physical device and allow it to be associated with the specific subscriber's medical record. The sealed and durable datacell is designed to be highly resistant to environmental hazards such as dirt, moisture, temperature, and shock.  
15 Data access is via single wire serial data communication and provides a full 4,096 bit transfer in less than 500ms. Datacell 24 also includes a datacell power source 70, memory address/control circuitry 72, and data registers 74. A suitable portable data storage device 22 for purposes of the present invention includes the Dallas Semiconductor 19XX family of Touch Memory devices.

20 As mentioned previously, the medical information record system of the present invention includes a distributed medical record database system for generating, maintaining, and updating personal medical information records. The distributed medical record database system is a database management system hosted on a Windows-based computing platform, and performs the following major functions: (1) creation and  
25 storage of subscriber records on hard disk; (2) display and printing of subscriber records; (3) loading (writing) of datacells; (4) reading and verification of datacells against subscriber files; and (5) updating of subscriber medical files and datacells.

FIG. 5 shows a simplified block diagram of the distributed medical record database system, broadly designated in the drawing by reference numeral 76. System 76  
30 includes both a central administration site 78 and at least one local administration site 80, although it is envisioned that the present invention will include multiple local



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administration sites across the country so that medical information records can be coordinated on a national scale. As shown in FIG. 5, each administration site includes a CPU/Memory 82, a display 84, hard disk storage 86, keyboard capability 88, a printer interface 90, and a modem interconnect 92 for communication between sites.

- 5 Additionally, each administration site includes a probe I/O port 94 for downloading of the medical records maintained by the administration sites to datacells 24.

Subscriber medical data files are generated and maintained on the distributed medical record database system 76 using a standard Database Management System (DBMS). Individual subscriber records are maintained with the database records  
10 structure and data contents as shown in the following Table 1.

Table 1 - Subscriber File Structure

Field ID	Field Name	Data Type	Description	Datacell Bytes
<b>Data Fields</b>				
1	Last Name	Text	Last Name of Subscriber	15
2	First Name	Text	First Name of Subscriber	10
3	Middle Initial	Text	Middle Initial of Subscriber	1
4	Sex	Text	Sex of Subscriber	1
5	Date of Birth	Text	Birthdate of patient	8
6	Social Security #	Text	SSN of Wearer	8
7	Blood Type	Blood Type Code	Code designating subscribers Blood Type	1
8	Religion	Religion Code	Code designating subscriber's religion	1
9	Donor Card Status	Yes/No	Code Indicating Donor Status	1
10	Code	Yes/No	Code Indicating CODE/NO CODE	1

Field ID	Field Name	Data Type	Description	Datacell Bytes
11 Physical Address	Street	Text	Physical Address Street	-
12 Physical Address	City	Text	Physical Address City	-
13 Physical Address	State	Text	Physical Address State	-
14 Physical Address	Zip Code	Text	Physical Address Zip Code	-
15 Mailing Address	Street	Text	Mailing Address Street	-
16 Mailing Address	City	Text	Mailing Address City	-
17 Mailing Address	State	Text	Mailing Address State	-
18 Mailing Address	Zip Code	Text	Mailing Address Zip Code	-
19	EC First Name	Text	First Name of emergency contact	10
20	EC Last Name	Text	Last Name of emergency contact	15
21	EC Phone Number	Text	Phone number of emergency contact	10
22	Physician First Name	Text	First Name of Physician	10
23	Physician Last Name	Text	Last Name of Physician	15
24	Physician Phone Number	Text	Phone number of Physician	10

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Field ID	Field Name	Data Type	Description	Datacell Bytes
25	Insurance Carrier	Text	Subscriber's Insurance Carrier	-
26	Policy Number	Text	Subscriber's Policy Number	-
27	Current Medical Condition A	Special Medical Condition Code-A	Code designating Special Medical Condition - A	1
28	Current Medical Condition B	Special Medical Condition Code-B	Code designating Special Medical Condition - B	1
29	Current Medical Condition C	Special Medical Condition Code-C	Code designating Special Medical Condition - C	1
30	Special Medical Condition D	Text	Text describing Special Medical Condition not found in standard table	15
31	Special Medical Condition E	Text	Text describing Special Medical Condition not found in standard table	15
32	Current Medications A	Current Medical Condition Code-A	Text describing prescription medication	1
33	Current Medications B	Current Medical Condition Code-B	Text describing prescription medication	1
34	Current Medications C	Current Medical Condition Code-C	Text describing prescription medication	1
35	Special Medications D	Text	Text describing prescription medication not in the standard medication table	15

Field ID	Field Name	Data Type	Description	Datacell Bytes
36	Special Medications E	Text	Text describing prescription medication not in the standard medication table	15
37	Allergy Field A	Allergy Code-A	Code designating Allergy Type-A	1
38	Allergy Field B	Allergy Code-B	Code designating Allergy Type-B	1
39	Allergy Field C	Allergy Code-C	Code designating Allergy Type-C	1
40	Creation Date	Text	Date Of Record/ Datacell creation	8
41	Revision Date	Text	Date of Record/ Datacell revision	8
41	Revision #	Text	Revision # Of Record/Datacell	1
42	Datacell ROM ID	Text	ROM ID of Subscribers Datacell (This ID is unique to each Datacell and is permanently stored (burned) in ROM at the factory)	0 (This ID is stored as part of the subscriber Database file but is burned into a permanent ROM)

As can be seen, FIG. 6 shows the three primary operating modes of distributed medical record database system 76 of medical record system 20. These three primary operating modes are: (A) file generation and datacell creation, (B) file and datacell updates, and (C) datacell verification. The Create mode (A) is invoked with a new subscriber and results in the creation of both a new record and a new datacell as denoted at step 96. Following the entry of new updated subscriber data at step 98, a file verification process 100 is performed. The subscriber data is then written to the datacell

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at step 102, and CRC error-checking is performed at step 104 to ensure that subscriber data has been transferred to the datacell error free. Following successful data transfer as determined at step 106, the datacell ROM ID is read into the system from the permanent, internal datacell ROM at step 108 and stored with the subscriber record at step 110. By  
5 this method, there is always a recorded association between the subscriber record and a specific, unique datacell. Following this step, the entire subscriber record is stored in the distributed database system 76 at step 112.

In the Update record mode (B), a file administrator can call up an existing subscriber's file at step 114 by searching for name, social security number, or datacell ID.  
10 The file is then updated at step 98, and either a new datacell written, or the original datacell updated with the new subscriber data. In the Verify mode (C), the datacell verification process begins at step 116. At step 118, the datacell is probed and both the datacell ID and the data contents are read in the PC memory for display. CRC error-checking is performed at step 120 and a determination is made as to whether a data  
15 transfer error exists as shown in block 122. If a repeated error occurs as shown in block 124, the system declares the datacell as bad at step 126 such that a new datacell is required. The database system is searched by datacell ID at step 128, and if no record is found which matches the datacell ID as determined in step 130, an error message is displayed at step 132 indicating that no record is found. If a record is found but there is  
20 a mismatch in the data fields as determined by step 134, a data error message is displayed at step 136 indicating that the datacell is invalid. In this situation, the data has either been corrupted or the subscriber database record updated without a corresponding datacell written. In this case, a new datacell must be written from the latest subscriber record. If a record is found with matching data fields, the subscriber data is displayed and a  
25 record match message 138 is displayed to the operator.

FIGS. 7A and 7B illustrate representative data screens for the medical information record system 20 according to the present invention. FIG. 7A shows the main screen of system 20 allowing selection of each of the major record field categories. FIG. 7B shows each of the individual data entry screen for seven specific data types.  
30 These include subscriber/patient basic information screen 140, address information screen 142, emergency contact and physician information screen 144, insurance

information screen 146, relevant medical conditions information screen 148, special medications information screen 150, and allergies information screen 152. Pull-down menus are used to select from standard data categories, and fill-in screens are used to allow for entry of non-standard conditions.

5           FIG. 8 provides further details of the handheld reader 30 shown in FIG. 1. More specifically, FIG. 8 is a simplified block diagram illustrating the main components of handheld reader 30 which include a display 34, CPU/Memory 154, communications interface 156, keypad 38, printer interface 36, and power source 158. Additionally, reader 30 includes a probe I/O port 160 for the data probe 32. As shown in FIG. 8,  
10       communications interface 156 can optionally communicate with a remote data terminal 162 to provide access to database system 76 for real-time record verification or to a local hospital or emergency medical center for data transmission for emergency room notification. Thus, remote data terminal 162 can include a satellite link 164, an RF datalink 166, and/or a cellular datalink 168. This capability allows the present invention  
15       to be used, for example, by emergency medical personnel to communicate with an organ donor network to aid in the rapid identification of candidate organ recipients.

          FIG. 9 provides further details of the keyboard and display of reader 30. When the operator probes a datacell, reader 30 immediately responds with a display of the subscriber name, donor status, bloodtype, social security number, emergency contacts,  
20       etc. A single keystroke brings up a display of current medical conditions, existing medications, and known allergies. Both horizontal and vertical scrolling is used to maximize utilization of the LCD screen. This scrolling is performed with scroll arrow keys 170 on keyboard 38. The down arrow on keyboard 38 allows the operator to scroll down the retrieved medical record selecting four of seven lines of medical data for  
25       review. If the data displayed on the screen is too long for the 20 character screen, the reader will automatically scroll side-to-side to allow the operator to view the entire line content. The left direction arrow key stops side-to-side scrolling and the right direction arrow key restarts scrolling. The "EXE" button allows the operator to view the first of three medical screens, i.e., conditions, medications, allergies. The "EXE" button is  
30       pressed to view each screen. If a hardcopy printout of the medical data is desired, the operator presses the "MODE" button to start the print function.

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As is evident from the foregoing description, the medical information record system of the present invention provides rapid access to critical patient medical data for paramedics, ER response teams, and other medical personnel. The invention utilizes small, compact, portable data storage devices worn by patients with critical medical histories and contain current medical data important for rapid stabilization and treatment of an emergency medical condition. The present invention also utilizes a distributed medical record database system to establish, maintain, and update patient records and datacells for nationwide coordination and rapid update of patient records.

WE CLAIM:

1. A medical information record system for providing access to medical information of persons in emergency response situations, the medical information system comprising: a portable data storage device located in a carrier worn by a person, the  
5 portable data storage device containing current personal medical records of medical information specific to the person wearing the data storage device; a handheld reading device for accessing the personal medical records contained in the portable data storage device, the handheld reading device including probe means for accessing the medical records, and means for displaying the medical records on the handheld reading device to  
10 medical personnel; and a distributed medical record database system for managing the personal medical records, said database system including a central database system location in communication with at least one localized database system location for coordination of the medical records on a national scale, the distributed medical record database system including means for creating and managing the personal medical records,  
15 and means for recording the personal medical records on the portable data storage device.
2. The medical information record system as defined in claim 1 wherein the portable data storage device comprises a self-contained semiconductor memory device.
3. The medical information record system as defined in claim 2 wherein  
20 the carrier comprises a bracelet, necklace, badge, or other easily located and accessible carrier.
4. The medical information record system as defined in claim 2 wherein the portable data storage device includes a permanently stored and externally readable identification number to provide a permanent association between a person and a specific  
25 storage device.
5. The medical information record system as defined in claim 2 wherein the portable data storage device includes data transfer circuitry for read/write operations.
6. The medical information record system as defined in claim 5 wherein the portable data storage device includes cyclic redundancy check circuitry for  
30 transmission error detection.



7. The medical information record system as defined in claim 1 wherein the handheld reading device includes communication means for communicating a person's medical records accessed from the portable data storage device to a medical facility.
- 5 8. The medical information record system as defined in claim 7 wherein the communication means also communicates with the distributed medical record database system to provide substantially instantaneous verification of a person's medical records.
- 10 9. The medical information record system as defined in claim 1 wherein the probe means accesses the medical information contained in the portable data storage device via wireless communication.
10. The medical information record system as defined in claim 1 wherein the means for displaying of the handheld reading device comprises an LCD screen.
- 15 11. The medical information record system as defined in claim 10 wherein the means for displaying of the handheld reading device further comprises a printer for printing a hardcopy of the medical information accessed from the portable data storage device.
- 20 12. The medical information record system as defined in claim 1 wherein the means for creating and managing includes means for updating the personal medical records so that said records contain current personal medical information.
- 25 13. The medical information record system as defined in claim 1 wherein the distributed medical record database system further includes means for verifying the contents of the portable data storage device to ensure the accuracy and integrity of the personal medical records stored in the portable data storage device.
14. The medical information record system as defined in claim 1 wherein the personal medical records comprise data on a person's name, date of birth, address, blood type, existing medical conditions, medications, sensitivities or allergies, emergency contact phone number, physician contact number, organ donor status, and identification number.

15. A method of maintaining personal medical information records to provide access to medical information of persons in emergency response situations, the method comprising: generating and storing personal medical records on a distributed medical record database system; recording the personal medical records on portable data storage devices; providing a person with a portable data storage device located in a carrier worn by the person, the portable data storage device containing personal medical records specific to the person; updating the personal medical records as necessary in the distributed medical record database system and in the portable data storage device so that said records contain current personal medical information; and accessing the personal medical records from the portable data storage device worn by the person with a handheld reading device to display the personal medical records to medical personnel in emergency response situations.

16. The method as defined in claim 15 further comprising the step of: providing a central medical record database system location and at least one localized medical record database system location for coordination of the personal medical records on a national scale.

17. The method as defined in claim 15 further comprising the step of: verifying the contents of the portable data storage device to ensure the accuracy and integrity of the personal medical records stored in the portable data storage device.

18. The method as defined in claim 15 further comprising the step of: communicating the personal medical records accessed from the portable data storage device to a medical facility.

19. The method as defined in claim 15 wherein the portable data storage device comprises a self-contained semiconductor memory device.

20. The method as defined in claim 15 wherein the carrier comprises a bracelet, necklace, badge, or other easily located and accessible carrier.

21. The method as defined in claim 15 wherein the portable data storage device includes a permanently stored and externally readable identification number to provide a permanent association between a person and a specific storage device.

22. The method as defined in claim 15 wherein the personal medical records comprise data on a person's name, date of birth, address, blood type, existing medical

conditions, medications, sensitivities or allergies, emergency contact phone number, physician contact number, organ donor status, and identification number.

23. A medical information record system for providing access to medical information of persons in emergency response situations, the medical information system comprising: a portable data storage device located in a carrier worn by a person, the portable data storage device containing current personal medical records of medical information specific to the person wearing the data storage device; a handheld reading device for accessing the personal medical records contained in the portable data storage device, the handheld reading device including probe means for accessing the medical records, and means for displaying the medical records on the handheld reading device to medical personnel; and a distributed medical record database system for generating, maintaining, and updating the personal medical records, said database system including a central database system location in communication with at least one localized database system location for coordination of the medical records on a national scale, the distributed medical record database system including means for creating and storing the personal medical records, means for updating the personal medical records so that said records contain current personal medical information, means for recording the personal medical records on the portable data storage device, and means for verifying the contents of the portable data storage device to ensure the accuracy and integrity of the personal medical records stored in the portable data storage device.

24. The medical information record system as defined in claim 23 wherein the handheld reading device includes communication means for communicating a person's medical records accessed from the portable data storage device to a medical facility.

25. The medical information record system as defined in claim 23 wherein the portable data storage device comprises a self-contained semiconductor memory device.

26. The medical information record system as defined in claim 25 wherein the carrier comprises a bracelet, necklace, badge, or other easily located and accessible carrier.

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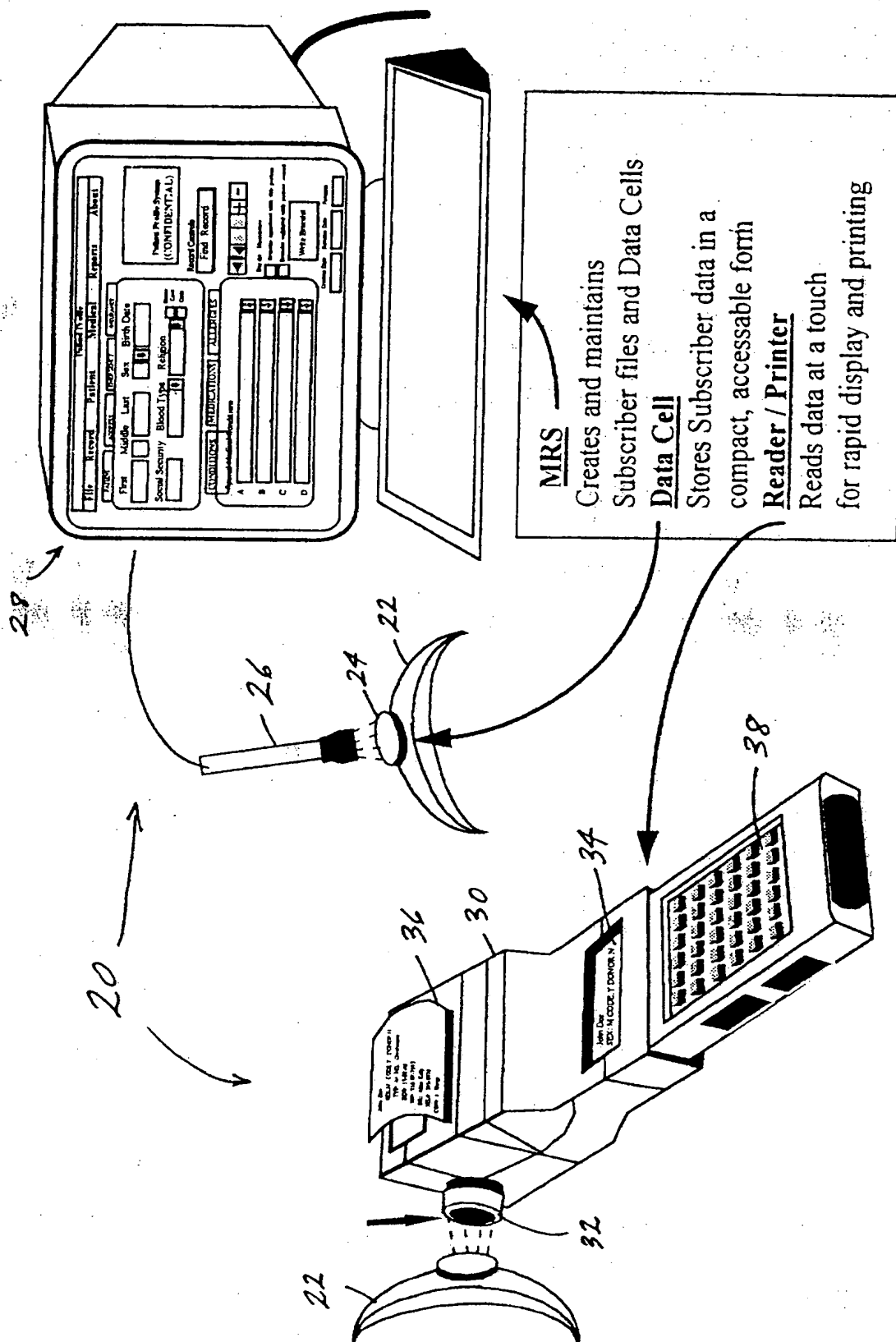


Fig. 1

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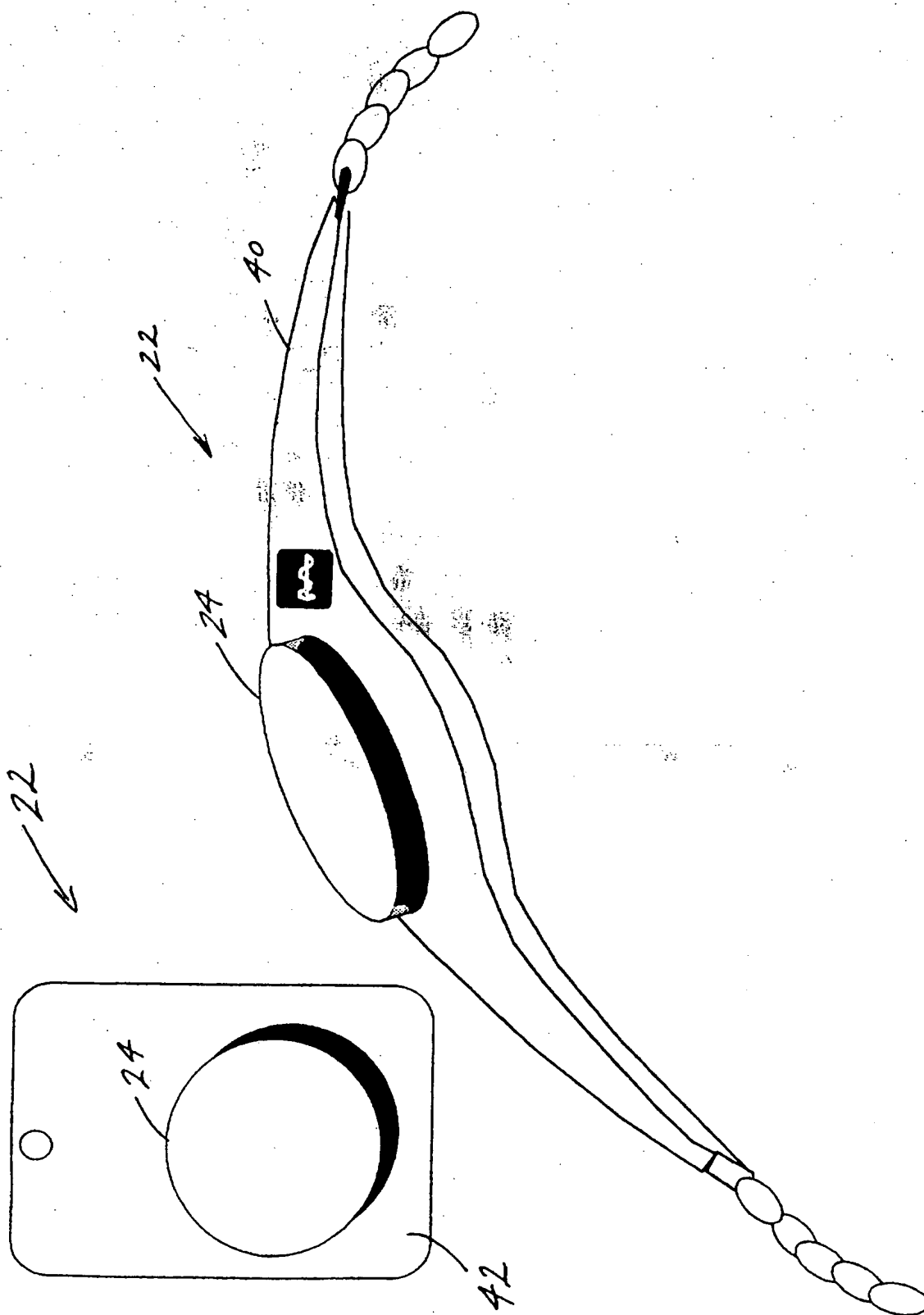


Fig. 2

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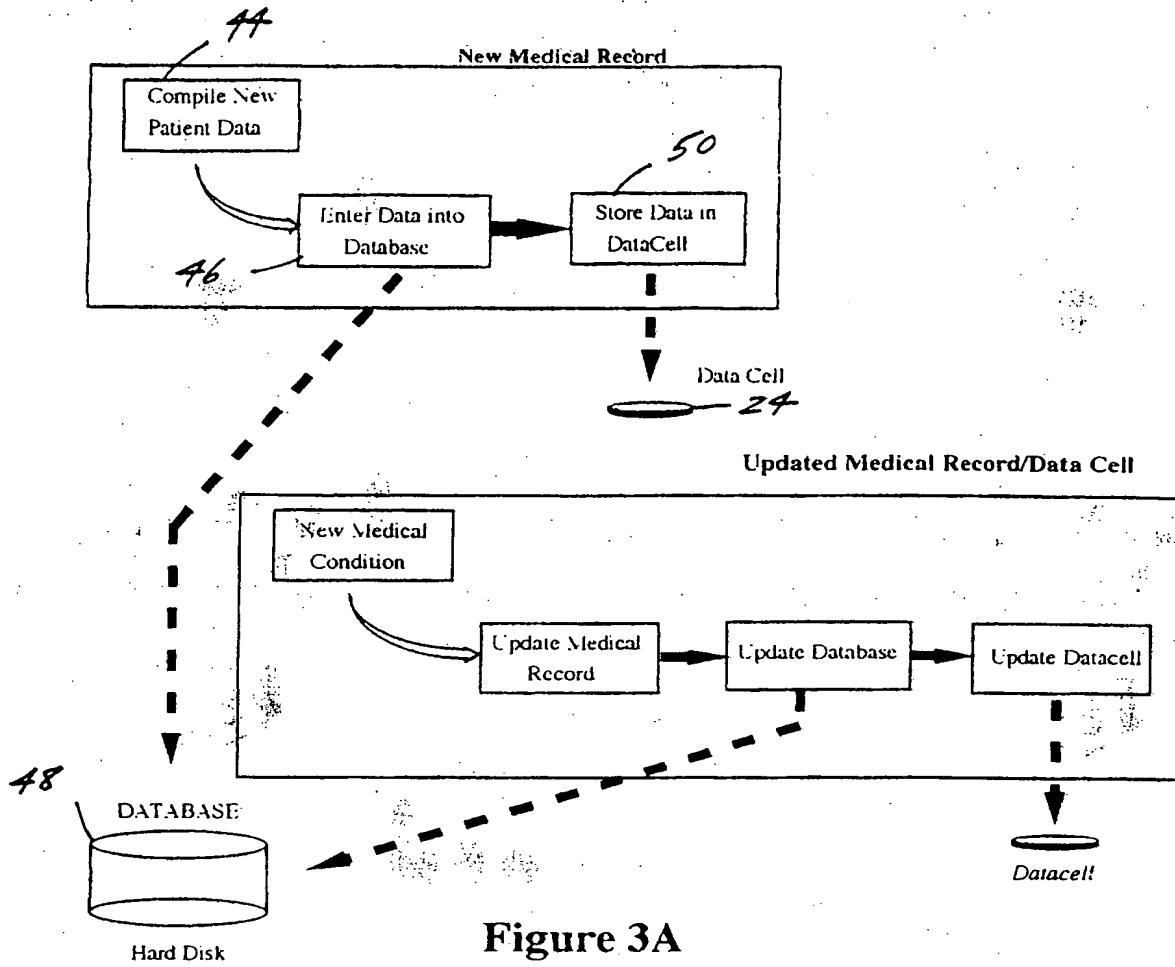


Figure 3A

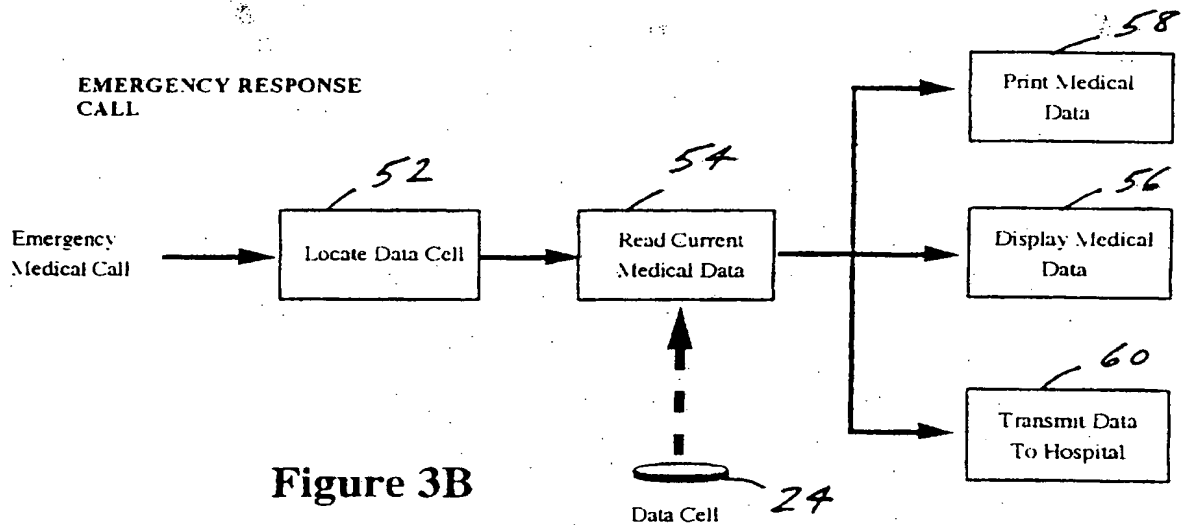


Figure 3B

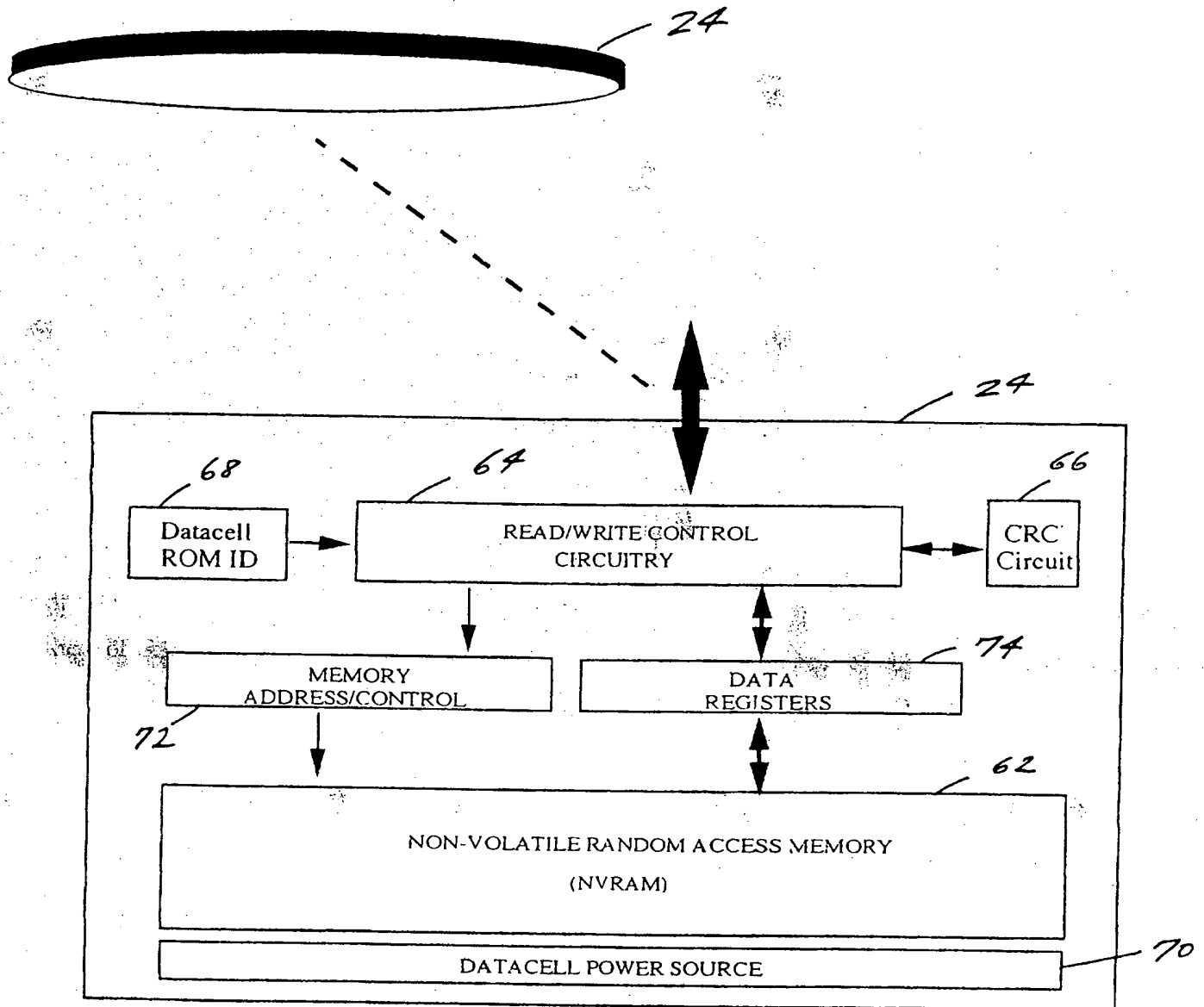
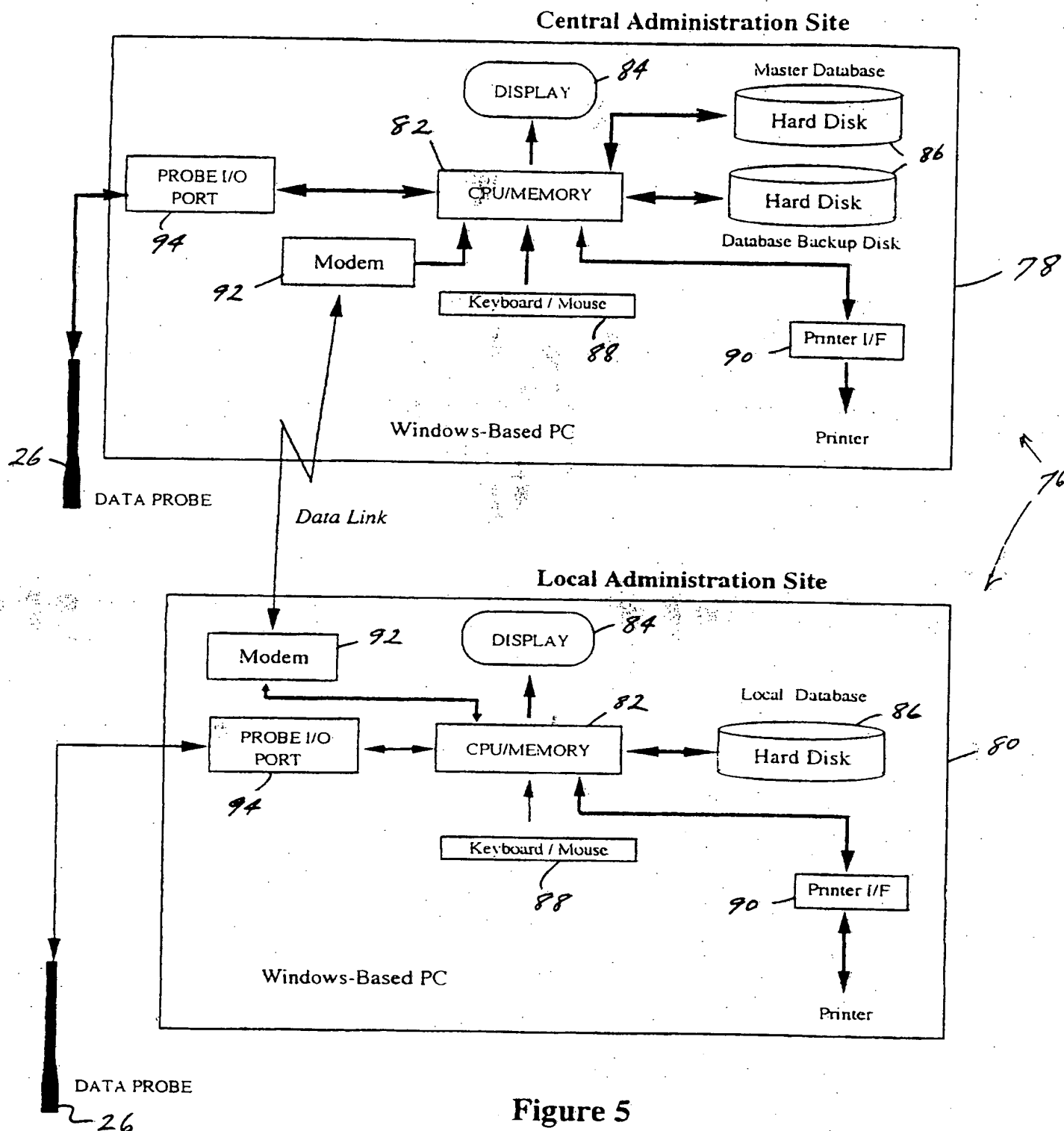


Figure 4





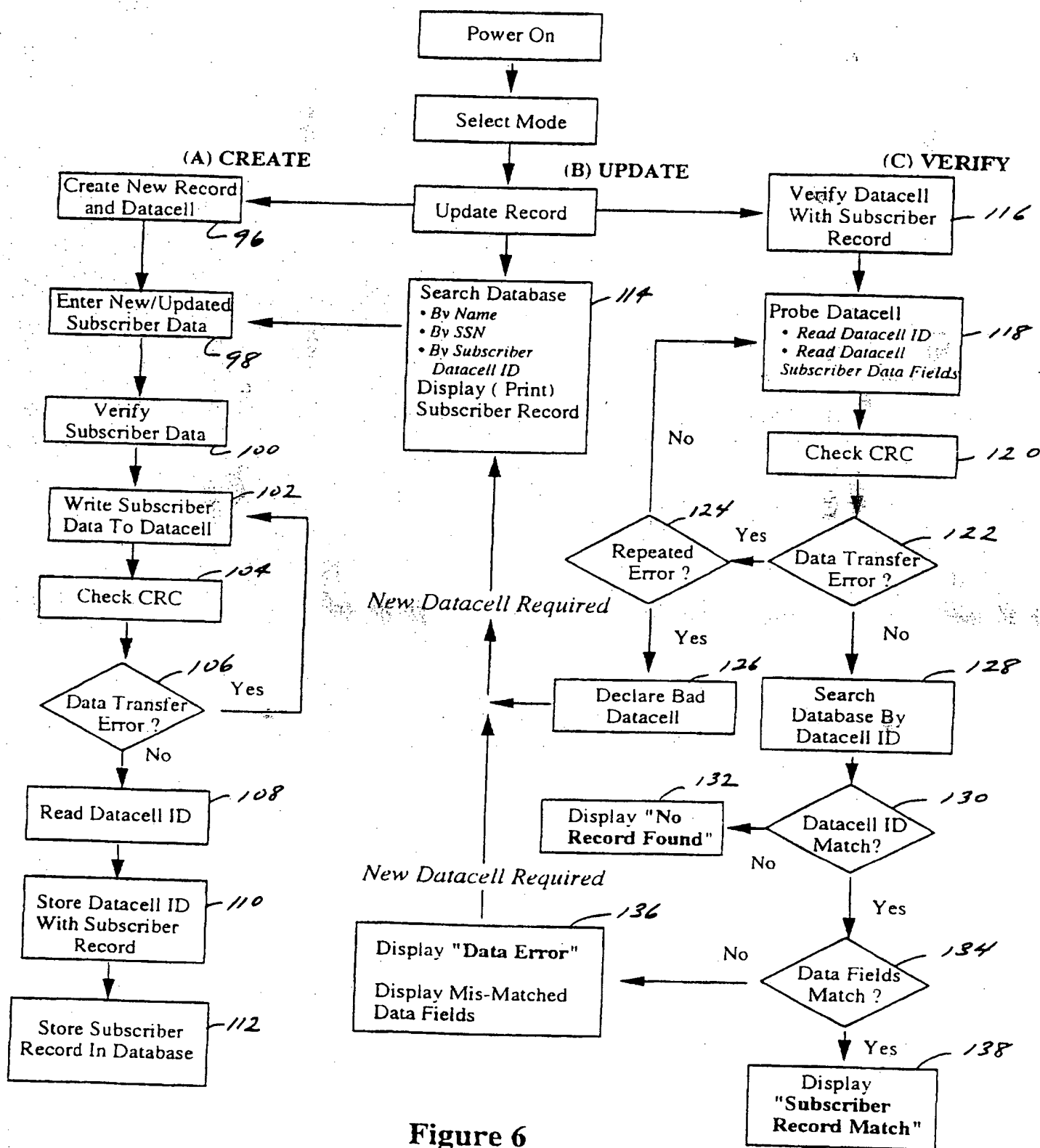


Figure 6

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← 28

Patient Profile System  
(CONFIDENTIAL)

Record Controls

Find Record

Bracelet Maintenance  
☐ Bracelet associated with this patient  
☐ Bracelet validated with patient record

Write Bracelet

Creation Date Revision Date Revision

File Record Patient Medical Reports About

Patient ADDRESS EMERGENCY INSURANCE

First Middle Last Sex Birth Date

Social Security Blood Type Religion Name Code

CONDITIONS MEDICATIONS ALLERGIES

Special Medical Conditions  
A B C D

Fig: 7A

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140

PATIENT

First  
Middle  
Last

Sex

Birth Date

Social Security

Blood Type

Religion

Down Card  
DNR

Patient basic  
information

142

ADDRESS

Street

City

State

Zip

Mail Address

Street

City

State

Zip

Address  
information

144

EMERGENCY

Emergency Contact  
First  
Last

Phone

Physician  
First  
Last

Phone

Emergency  
Contact  
and physician  
information

146

INSURANCE

Insurance  
Insurance Company  
Policy Number

Insurance Company  
Policy Number

Insurance  
information

148

CONDITIONS

Special Medical Conditions  
A  
B  
C

Special Medical Conditions

Medical  
Conditions  
information

150

MEDICATIONS

Current Medications  
A  
B  
C

Special Medication A

Special Medication D

Special  
Medications  
information

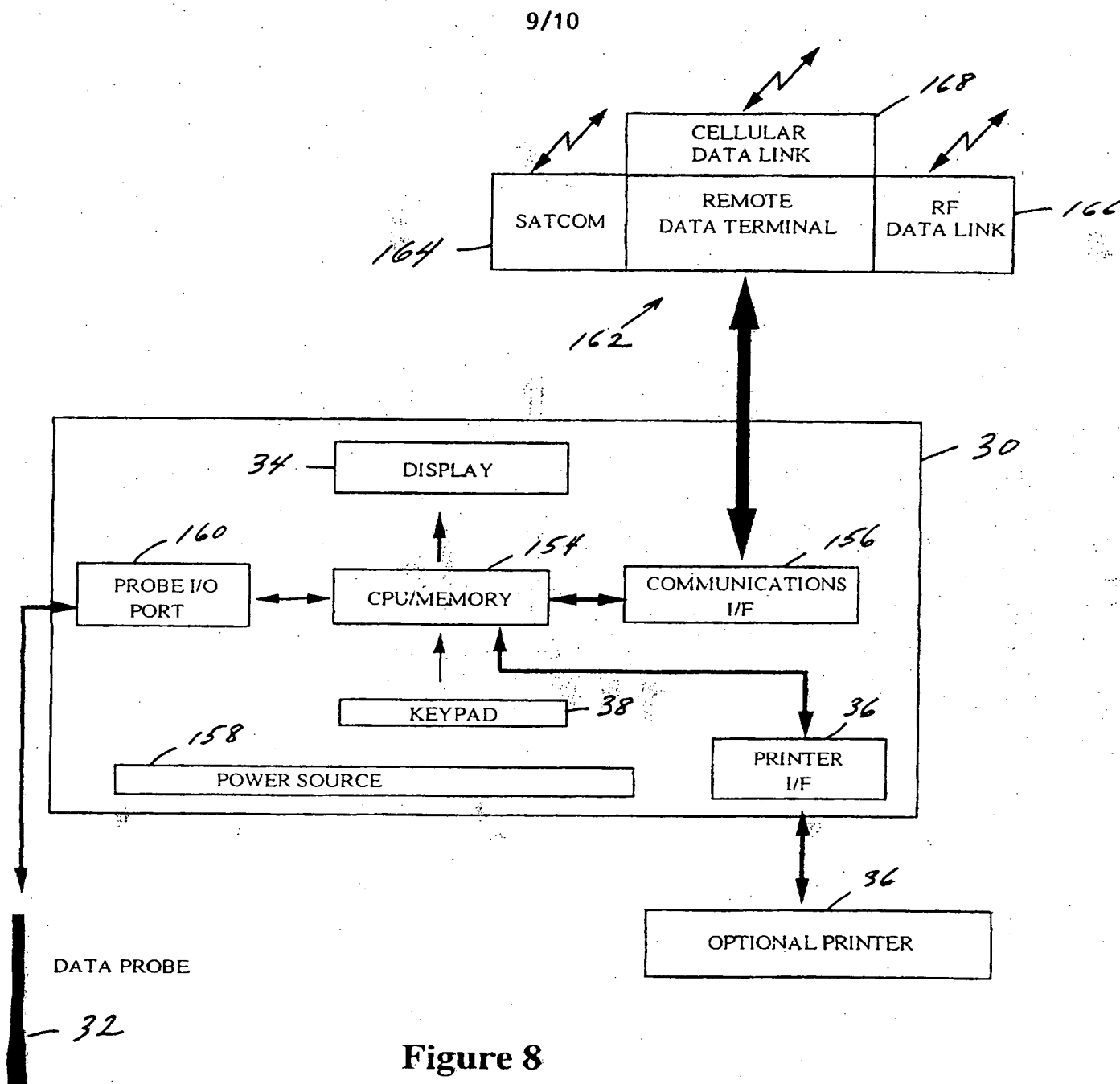
152

ALLERGIES

Allergies  
A  
B  
C

Screen #7  
Allergies  
information

Fig.7B



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Reader Keyboard

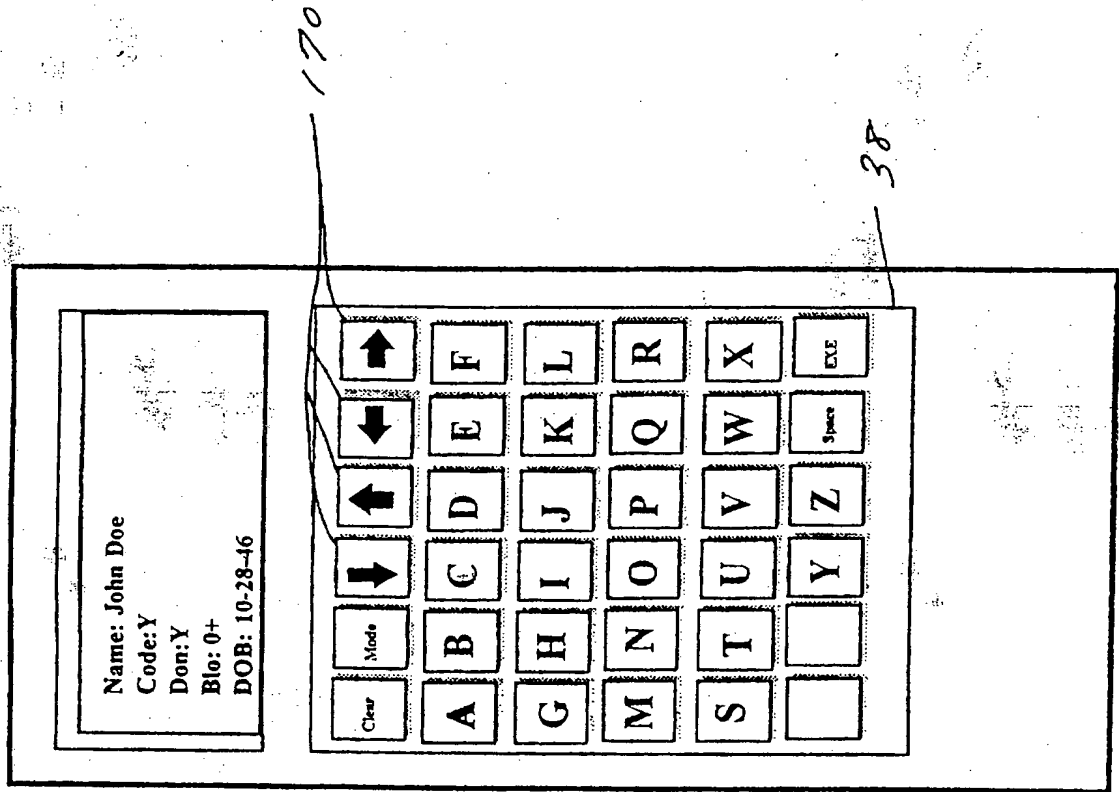


Fig. 9

## INTERNATIONAL SEARCH REPORT

Internat. Application No.

PCT/US 96/20398

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A61B5/117

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 916 441 A (P.P. GOMBRICH) 10 April 1990	1-5
X	see column 1, line 47 - column 3, line 2	7-10
X	see column 4, line 38 - column 7, line 27	12-26
X	---	
X	WO 94 06105 A (LIPOMATRIX, INC.) 17 March 1994	1-5, 7-9, 12-17
X	see page 3, line 30 - page 4, line 36	19-24, 26
	see page 5, line 21 - page 6, line 23	
X	---	
A	WO 94 04094 A (LIPOMATRIX, INC.) 3 March 1994	1-4, 7-9, 14-16
A	see page 3, line 1 - page 4, line 5	19-23
A	see page 6, line 1 - page 7, line 3	25, 26
	---	
	-/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

- \* "A" document defining the general state of the art which is not considered to be of particular relevance
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\* "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\* "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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\* "&" document member of the same patent family

Date of the actual completion of the international search

9 May 1997

Date of mailing of the international search report

20.05.97

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## INTERNATIONAL SEARCH REPORT

Internat. Application No.

PCT/US 96/20398

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

International Application No.

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